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similar vicissitudes. Our clothing trade has seldom been long suffering, while our silk manufactures in Spitalfields like those of Lyons are periodically subject to severe depression. But then, on the other hand, a land in which no luxury is enjoyed, one entirely free from "barbaric splendour and pomp," still more so, one in which property is equalized by law, leaves no margin and store for bad times; it supposes famines unknown, seasons uniformly healthy and propitious; it provides no reserve-fund wherewith a rich class, as in England, has occasionally kept alive a poor nation, such as Ireland.

Facts bearing on the Progress of the Railway System.

By WYNDHAM HARDING.

[Read before the Statistical Section of the British Association at Swansea,
14th August, 1848.]

THE modern Railway System of Europe may be said to date from 1830, when the construction by the English engineer, George Stephenson, of the Liverpool and Manchester Railway with its locomotive engines, was completed.

After that date we heard no more of such prophecies as the following, (from the *Quarterly Review* in 1825) which it is not useless to record as a lesson of caution to us for the future. "As to those persons who speculate on making railways generally throughout the kingdom, and superseding all the canals, all the wagons, mails, and stage-coaches, post-chaises, and in short, every other mode of conveyance by land and by water, we deem them and their visionary schemes unworthy of notice. What, for instance, can be more *palpably absurd and ridiculous* than the following paragraph," in which a prospect is held out of locomotive travelling twice as fast as stage-coaches? "We should as soon," adds the reviewer, "expect the people of Woolwich to suffer themselves to be fired off upon one of Congreve's ricochet rockets as trust themselves to the mercy of such a machine going at such a rate."

The modern railway system has, however, not only done this, giving rise to new habits in the present generation, but it has proved to be the great mechanical invention of the 19th century as the steam-engine was of the 18th; but it is still in its infancy, it is especially the province of statistical inquiry to watch its growth, so that on the one hand, timely remedies may be applied to its defects, and on the other, free scope may be given to its beneficial tendencies.

Valuable papers have been contributed by Mr. Laing, Mr. Porter, Mr. Graham, and others, analysing the traffic on railways during the infancy of the system to the year 1843. Shortly before that period, there had been a pause in railways. During two years a few miles of railway had been sanctioned—but the period which has since elapsed comprises the memorable railway mania years of 1845 and 1846—under this excitement, intelligence and emulation have been stimulated among the managers of railways to the utmost, and the system has rapidly advanced. The consolidation of railways under a few great companies by the process styled amalgamation has proceeded—the

atmospheric, an entirely new system of traction, has been brought forward. The electric telegraph (conveying intelligence, it is said, at the rate of 280,000 miles a second) has been widely introduced. Express trains, travelling at nearly the highest attainable speeds, have been established, and the length of railways in operation has been doubled.

It therefore becomes a matter of much interest to enquire to what the results of so active a period point.

Have low fares answered? Has the 3rd class traffic, the most important to the bulk of the people, been encouraged, and has it been found wise, not only for the users but for the owners of railways, to encourage it, or the reverse?

Has the increase of speed been successful, and are we likely to travel faster or slower hereafter? How have the receipts kept up while the length of railway has been doubled? Did the first 2,000 miles get the cream of the traffic, as has often been thought, and has the average receipt per mile consequently fallen off? Should the experience of the past, in short, give us confidence in urging on the system or not?

In the following investigation and collection of facts it has been attempted to throw some light upon these points, the recent publication of the official railway returns for 1846 and 1847 affording peculiar facilities for the purpose*.

The following paper refers to English, Scotch, and Welsh lines only—the Irish lines are excluded, the economical condition of Ireland being different from that of this country, and few railways being there open.

Comparative Lengths of Railway open in 1843 and 1847 and Receipts thereon.

	Miles.
The length of English, Scotch, and Welsh Railways open in June, 1843, was 1,990†	
The length of Railway open at the commencement of 1848 was.....	3,597‡
The gross receipts returned for the year 1842 were	£4,740,000§
The gross receipts returned for the year ending June 30, 1847, were....	8,326,772||

After making the necessary corrections in the figures ¶ given above the average receipts per mile of railway were,

In 1842.....	£2,489
In 1847.....	2,596

We therefore arrive at the important fact, that although the mileage of our lines has been doubled, the average receipts per mile have been more than doubled.

* I have to acknowledge many obligations to those who, having gone over parts of the field before, have helped to reduce the mass of figures with which we have to deal into shape. It is to be regretted that the Statistical Returns of the Government Railway Department are not made out more completely, and with greater punctuality. Columns are frequently not duly filled up, and the returns are not published for a year after they are due. Thus the Returns to the end of 1845 were not published until 1848.

† Mr. Laing's Paper, 1844, p. 5, appended to Fifth Report from Select Committee of Railways, 1844, (115·2.)

‡ Report of Railway Commissioners, p. 11, (after correction for lines opened in 1847.)

§ Mr. Laing's Paper, 1844, p. 7.

|| Railway Commissioners' Returns, 1846 and 1847.

¶ Principally for lines opened in the course of the year.

This must be regarded as a very favourable general feature in the state of railways; there was much reason to fear, that as the first railways ran between the great towns or traversed the manufacturing districts, the railways which were next opened would show a great falling in the receipts. Hitherto, then, we find that this is not so—a fact which tends to give us confidence as regards the great length of railway which has been sanctioned by Parliament but is not yet open.

Lines Sanctioned but not Open.

The length of railway sanctioned by Parliament at the commencement of 1848, but not then open, was 7,150 miles*. A considerable portion of this is in progress more or less rapid.

On the 1st May, 1847, 5,209 miles were returned† as in progress, on which 218,792 persons were employed, or 42 per mile‡.

When the railways now in contemplation are completed, and it is probable that the greater portion will be so in the course of the next five years, we shall have upwards of 10,000 miles of railway open, on which, judging from the numbers employed on lines now open§, (viz., 14 per mile) 140,000 persons will be permanently employed at good wages, representing (at 5 to a family) $\frac{5}{8}$ of a million of the gross population. The importance of this addition to our internal communications will be appreciated, when it is remembered that there appear to be only about 4,000 miles of inland navigation, and 30,000 miles of turnpike-road open for traffic in the country.

Analysis of Traffic.

The gross traffic for the year ending June 30th, 1847, was, as we have seen

£8,366,000

There were conveyed during this year (from the Returns of the Board of Trade) in round numbers||

Seven million tons of merchandise and goods.	|	Half a million horned cattle.
Eight million tons of coal.		One and a-half million sheep.
		A hundred thousand horses.

Of the gross sum £8,366,000, the passenger receipts were	£5,024,000
The receipts from all other sources, goods, cattle, carriages, parcels, mails, &c.	3,342,000

8,366,000

In every 100l. of receipts the passenger traffic therefore forms..... 60 per cent.

The traffic receipt from other sources 40 „

100 „

In 1842 these proportions were as..... 64
to..... 36

100

* Parliamentary Returns.

† Parliamentary Return, (House of Commons,) 1847, (579.)

‡ Ibid.

§ As in this Return the number of miles returned as in progress are more than those really in construction, the number of men employed per mile is less than the truth.

|| These Returns are not complete, and they require some correction in respect of the same articles being sometimes conveyed over several different lines, and therefore counted more than once.

The proportion of traffic-receipts from other sources than passengers (being principally goods and cattle-traffic,) has thus increased, since 1842, as 40 to 36, or 11 per cent.

The total number of passengers carried in the year ending (June 30th)

1847 was 47,484,134*
As compared within 1842 22,403,478†

The average distance travelled by each passenger was, in 1842, 13 miles, in 1847 it was 16 miles.

The numbers and proportions of classes were

	In 1847.	In 1842.
1st class	14·2	20·2
2nd class.....	38·3	45·4
3rd class.....	47·5	34·4
	100·0	100·0

Thus, the 3rd class passengers (which have increased in number since 1842, from 6,000,000 annually to 21,000,000) now form nearly half of the whole number travelling, whereas in 1842 they formed less than one-third.

Only one-third of the 3rd class passengers have availed themselves of the parliamentary trains, arbitrarily (and as it appears to me unfairly) imposed upon railway companies in 1844.

The following Table, comparing the fares of the metropolitan railways in the year ending June, 1843, with those ending in the year June, 1847, shows the great reduction which has taken place in fares during the last four years.

To make the comparison more appreciable, the fares are taken as for 100 miles in pence.

Railways †.	1st Class. Fare for 100 miles.		2nd Class. Fare for 100 miles.		3rd Class. Fare for 100 miles.	
	In 1843.	In 1847.	In 1843.	In 1847.	In 1843.	In 1847.
London and North-Western....	334·8	218·1	241·1	144·6	131·2	93·3
Great Western	303·1	274·4	208·5	187·8	118·3	100·0
London and South-Western....	312·0	245·0	210·0	168·0	120·0	96·0
Eastern Counties	294·1	210·0	227·4	141·5	164·7	92·3
Northern and Eastern	217·4	....	165·5	....	110·9	....
South-Eastern	227·0	214·0	150·0	152·0	87·5	90·0
London and Brighton	350·0	263·0	225·0	171·0	150·0	109·0
Average	303·5	237·4	210·3	160·8	128·6	96·7
Difference per cent. ....	....	21·8	....	23·8	....	25·0

These results do not include the Return Tickets, generally introduced within the last three years, and effecting a reduction of fares even greater than is here shown.

This reduction in fares, coupled with the increase in the number of trains and the speed of travelling, must be regarded as the principal

* Railway Commissioners' Return, 1848.

† Mr. Laing's Paper, 1844, p. 11.

‡ Return of the Railway Department.

cause of the great increase of the number of passengers since 1843. We have already seen that the number in 1847 and 1842 are as 47,484,134, to 22,403,478. If we take into account the number of miles opened at those dates respectively, the annual number per mile was in 1842 = 11,772, and in 1847 = 14,806.

It was once the fashion to make comparisons unfavourably to our railways as regards fares with foreign railways. The comparison was inadmissible, because foreign railways were either constructed in whole or in part by the state, or else received direct aid from the state; whereas our railways have received anything but assistance from the state. Nevertheless, the fares of our lines, as given in the above Table, will now bear comparison with those of either the French, the Belgian, or the German railways, when the accommodation as to luggage and day-tickets, which we grant and they do not, is taken into account. In despatch and convenience of arrangement the comparison is altogether in favour of the English lines.

The proportion of 3rd class passengers has, we have seen, satisfactorily increased between 1842 and 1847; the 3rd class traffic has, however, developed itself very differently on different lines and it may be well to inquire into this.

The statement subjoined shows the 3rd class traffic of two metropolitan companies, (the Eastern Counties and the Great Western) two North of England companies, (the Lancashire and Yorkshire and the Newcastle and Berwick) and two Scotch companies, (the Edinburgh and Glasgow and Glasgow and Greenock).

Year ending June 30th, 1847.

Name of Railway.	Length in Miles.	Number of 3rd Class Passengers conveyed.	Proportion in every 100 of 3rd Class Passengers.
Glasgow, Paisley, Greenock	23	957,534	83·3
Newcastle and Berwick	65½	944,891	79·5
Edinburgh and Glasgow	46	836,025	72·8
Lancashire and Yorkshire	109	2,090,624	72·3
Midland	285	2,366,892	65·4
Eastern Counties.....	177	1,044,158	50·3
Great Western.....	240½	419,663	14·6

From this it appears, that while the Great Western Company, on a line of 241 miles long, have only carried 419,663, the Edinburgh and Glasgow Company, on a line 46 miles long, have carried 836,025, the Midland Company, (285 miles long) 2,366,892.

And that while on the Great Western only 15 out of every 100 passengers conveyed are 3rd class.

On the Eastern Counties, 50 out of every 100, and on the Glasgow, Paisley, and Greenock, 83 out of every 100 are 3rd class passengers.

Although it is true that the different character of the population and other circumstances will affect, to some extent, the relative number of 3rd class passengers on different lines, the disparity here is so great, that we can come to no other conclusion than that the arrangements of such a line as the Great Western as to 3rd class passengers,

must be such as to preclude hundreds of thousands of 3rd class passengers yearly from using the railway, who, with greater facilities, would be glad to use it.

I say this with confidence, because as manager of the Glasgow and Greenock Railway, where the 3rd class system has been more developed than on any line in the country, (and where, under very peculiar circumstances, we carried passengers for $\frac{1}{4}d.$ a mile) I had an opportunity of observing the real advantage and comfort which cheap travelling is to the working-class.

As the results of the working of that line afforded a remarkable instance of the effects of low fares, I have thought that it might not be uninteresting to record them.

The River Clyde runs beside the Glasgow, Paisley, and Greenock Railway, which is 23 miles long. The steam-boats had long afforded an excellent mode of transport between Glasgow and Greenock, the fares by boat before the railway opened, being from 1s. to 2s., and the time occupied about two hours. Glasgow, with a population of 274,000, was at one end of the line; Greenock, with a population of 36,000, at the other end of the line. Various summer watering places also lay at the mouth of the Clyde below Greenock. On the line were Paisley, (population 60,000) and Port Glasgow, (population 7,000).

Between Glasgow and Paisley was a canal, on which there were passenger-boats, drawn by horses at a speed of six miles per hour. These facilities gave rise to a great traffic before the railway was opened, the yearly number travelling along the course of the railway being 1,185,340, and the average fare 1s. 4d.

Notwithstanding this (in 1843), after the railway was opened, the numbers travelling by all means of conveyance were found to exceed 2,000,000, or to have increased 100 per cent., the average fare having in the meantime fallen to 10d.

This was the gross result, but the fares of the railway (originally 2s. 6d. 1st class, and 1s. 6d. 2nd class for 23 miles) were varied from time to time, and as I closely observed the effects of these variations, having caused an account to be taken of the number travelling by steam-boat and canal, as well as by railway, it may be well to state the results.

First Alteration. In 1842, uncovered open 3rd class carriages, at a fare of 6d. for the 23 miles, (or about $\frac{1}{4}d.$ per mile) were introduced on the railway between Glasgow and Greenock, whereupon the annual number of railway passengers between those places increased 224,000, being an increase of 32 per cent. of the total number travelling between these places either by railway or steam-boat.

The number of 1st and 2nd class fell off at the same time 39 per cent., the passengers having transferred themselves from the higher class carriages into the open 3rd class carriages, tempted by the difference of fares between $\frac{4}{4}d.$ per mile and $\frac{1}{4}d.$ per mile.

The gross receipts, however, increased simultaneously 15 per cent., the working expenses on the other hand, did not appreciably increase, although the average number of passengers per train increased from 72 to 117.

Second Alteration. The 3rd class fares were subsequently (in 1843) raised from 6d. to 1s., with the hope of increasing the revenue. The

whole number travelling (by railway and steamboat) immediately fell off 18 per cent.

The 1st and 2nd class railway passengers increased by 10 per cent., but the gross receipts fell off more than 10 per cent.

The effect was also tried of making the 3rd class carriages more comfortable by covering them in. This was found not to increase the number travelling, but it did reduce the number of 1st and 2nd class passengers by 16 per cent., and therefore caused considerable loss to the company.

The same experiment was repeated on the 2nd class carriages, they were made more comfortable by inserting glass windows instead of wooden shutters, and by carrying the interior partition higher.

The number of 1st class passengers shortly fell off by 12 per cent., but beyond this the 2nd class passengers did not appreciably increase; this experiment, therefore, also resulted in loss.

The results of these experiments were then,—

1st. That a reduction of fares to $\frac{1}{4}d.$ per mile, even from so low a rate as $\frac{1}{2}d.$ per mile, increased the number travelling by nearly a quarter of a million, or by two-thirds of the whole population of the district.

As these people were generally of the less affluent classes, it appears that they were actually drawn out of the noisome streets of Glasgow to the mouth of the Clyde, by the temptation of a very low fare, and immediately that the fare was raised they were driven back again into the city.

2nd. That under the circumstances of the line in question, cheap and rapid conveyance increased the number travelling, while improving the lower priced carriages did not appear to act in the same way, but merely tempted passengers from the higher class carriages, those from the 2nd class into the 3rd class carriages, and from the 1st to the 2nd class.

Of course it by no means follows that similar results would ensue on lines in other localities, each case must be determined by its peculiar conditions.

3rd. That no limit can be assigned to the number of travellers which cheapening and quickening the means of conveyance will create. The introduction of the railway, even where steamboats already afforded a most pleasant, rapid, and cheap communication, increased, we see, the number travelling from eleven hundred thousand to two millions, two millions being five times the whole population of the district.

I doubt whether either at home or abroad, so large a proportion of travellers to the whole population is to be found.

The traffic between Glasgow and Paisley is probably the most remarkable instance on record of the increase of travelling caused by increased facilities. In 1814 there was only one coach a week between Glasgow and Paisley conveying about 2,000 passengers per annum; if we multiply this by 5 to allow for the greater number of gigs and private vehicles then in use, we only get 10,000 passengers per annum conveyed between the two places.

In 1842, the numbers travelling by public conveyance between Glasgow and Paisley were upwards of 900,000. Now, as the population between 1814 and 1842, had only about doubled itself, while the traffic, as we see, had multiplied itself ninety-fold, it follows

that the increased facilities of transport had increased the number travelling relatively to the population 45 times, that is to say, that for every journey taken by a certain number of inhabitants of Glasgow or Paisley in 1814, 45 journeys were taken by the same number in 1843.

These results, I conceive, place it beyond a doubt, that we should spare no effort to make railway travelling cheap and within the reach of all classes.

Now, there is only one true way of encouraging cheap travelling, and that is by keeping down the original cost and the annual expenses of railways. All the other contrivances which the public are inclined to trust, such as legislative restriction on profits and so on, are mere delusions. Even competition is inapplicable to railways, and is not to be relied on*. Mr. R. Stephenson, the engineer, put the whole case into one sentence, when he said, "where combination is practicable competition is impossible." The experience of all railway competition shows that this is true; when, therefore, under the plea of competition, unnecessary outlay is being incurred, the public may rest assured that they will ultimately suffer for it in the charges they will have to pay.

The late Mr. Butler Williams† and Mr. Hill Williams, the actuary, have compiled some useful‡ tables to show arithmetically, "how far a remunerative charge for the conveyance of passengers and goods on railways is modified by the original cost and other circumstances."

The following is an extract showing the effect of increased cost of construction.

	Total yearly traffic, number of Passengers or Tons of Goods.	Original cost of construction £15,000 per mile.	Original cost of construction £20,000 per mile.	Original cost of construction £25,000 per mile.	Original cost of construction £30,000 per mile.
Fixed charge per mile on every passenger or ton of goods requisite in order to give common interest, 5 per cent., on the outlay.....	90,000	1·00 <i>d.</i>	1·33 <i>d.</i>	1·66 <i>d.</i>	2·00 <i>d.</i>

We see from this that the fixed charge on every ton of goods or passengers must average 2*d.* per mile to return common interest on a railway costing 30,000*l.* per mile, whereas, if the railway cost 20,000*l.* 1½*d.* per mile would be sufficient, and if it cost 15,000*l.* 1*d.* per mile would be sufficient. It is so important that there should be no doubt in the public mind on this point, that I have enlarged upon it in a note§, and

* Evidence, Select Committee on Railway Act Enactments, 1846.

† See Mr. Butler Williams' interesting paper on Railway Management. *Journal of the Statistical Society*, v. ix., part 2.

‡ Appendix, No. 7, Select Committee on Railway Act Enactments, 1846.

§ *Theory and Practice of Railway Charges.*

There is a mischievous notion abroad which has been countenanced even by some Railway Companies, that the public can be secured against high charges by some

endeavoured to point out the fallacies under which it is sometimes contended that the public have no concern in the extravagance of private companies; an extravagance into which the public are mainly instrumental in driving them. Witness the encouragement lately given to competing railways.

Having considered the subject of fares we turn to that of

Working Expenses.

In estimating the probable profits on railways it is customary to take the working expenses at a certain per centage (generally about 40 per cent.) of the receipts.

possible machinery of legislation, or means other than strict economy in the original construction and the subsequent working of railways.

The case of the Blackwall Railway is quoted, which cost 287,000*l.* per mile, and only charges 1·6*d.* per mile for the 1st class, and ·67*d.* per mile for the 2nd class; and compared with other railways, such, for instance, as the London and South-Western, which cost only 28,000*l.* per mile, or $\frac{1}{10}$ th of the Blackwall, and yet charges $\frac{3}{4}$ *d.* more than the Blackwall; and it is attempted from this to show that the original cost of a line has nothing to do with the fares subsequently charged.

Now nothing can be more fallacious than this, as a very slight consideration of the principles which determine railway charges shows.

If railways were perfectly unchecked monopolies restricted by no fear of competition or restrictive legislation, each Company would then have to seek that fare which would produce a maximum revenue, (that is, the fare of maximum effect,) and this theoretical fare would, it is true, have no relation whatever to the original cost.

This is what railways did when the system began, just as a patentee of a new invention guesses at a charge for the use of his patent which shall produce him most money, and they fortunately found that a fare about half that of the stage coaches is that fare of maximum effect, and accordingly charged that fare.

But the condition of unchecked monopoly could only obtain in the infancy of a system.

The success of the invention once established, railways became like any other mercantile undertakings, and the returns on the capital laid out on railways was from that moment determined solely by the peculiar risks or advantages attending the investment comparatively to other investments.

Immediately that this was so, the theoretical fare of maximum effect disappeared from the scene, and Railway Companies could only, and can now only, looking at the question broadly, make such charges as will secure to them the rate of profit which trade sanctions in this particular investment.

The more, therefore, railways cost the greater will be the capital on which such average return or profit will have to be earned, and the greater the returns required, the higher necessarily the charge to those who use the railway. To take a case—

If a certain number of miles of railway cost, in consequence of the expense thrown upon them by Parliament, or the folly of their constructors, fifteen millions, which need otherwise have cost only ten millions, and if 6 per cent. be the ultimate average rate of profit for which people are willing to invest capital in constructing railways, it is clear that the public using this railway must pay more (by three hundred thousand a-year) to pay 6 per cent. on fifteen millions than on ten millions; the same fact is presented in another shape by Mr. H. Williams' Table given above.

From what is stated above as true in the general, it is not to be inferred that economy in railways does not concern the companies as well as the public; the effect of extravagance, of course, falls first and most heavily on the owners of the railways, and although the laws of trade must ultimately vindicate themselves and the charges be determined on the principles explained above, the first projectors of the railways may be ruined in the mean time. The success and profit of each individual Railway Company will therefore depend mainly on the economy of construction and working; but both the public and the proprietors of railways are alike concerned in enforcing that economy.

This mode of estimating is fallacious, as the following statement* shows. The lines selected represent different classes of railway, namely, railways terminating in London, the Eastern Counties and Great Western Railways, railways in the manufacturing districts, as the Manchester and Leeds and two Scotch railways.

Railway.	Length.	Working Expenses per Mile.	Per centage of Working Expenses to Receipts.
		£	
Eastern Counties.....	114	1,109	44·0
Great Western.....	236	1,418	36·5
Manchester and Leeds	61	1,825	32·0 (10 miles on the Midland Railway)
Newcastle and Carlisle	65	517	39·3
Glasgow and Ayr.....	51	711	40·0
Arbroath and Forfar	15	234	29·0

It will be seen that while the working expenses of the Glasgow and Ayr Railway are only 711*l.* per mile, they amount to 40 per cent. of the receipts, whereas those of the Manchester and Leeds, which amount to 1,825*l.* per mile, are only 32 per cent. of the receipts. An estimate of working expenses on the principle of per centage of the receipts is therefore unsafe.

The amalgamations which have taken place to so great an extent of late years, that there are now only about fifty nominally distinct companies, may be considered to have had some effect on the working expenses, and the first consequence of consolidating two or three companies, each with an independent head office, into one, is undoubtedly to reduce the expense. But as these concerns grow they become, in the course of time, cumbrous, and a subdivision into departments becomes requisite, each of which must have a staff, so that it may be doubted whether, as a mere matter of economy, centralisation will succeed when carried to such an extent as to make it impracticable for any one or two chief officers to exercise personal control over the system.

We will now consider some of the more prominent points of interest connected with the working of railways during the last three years, commencing with *safety*.

Accidents.

Year.	Number of Passengers Conveyed.	Numbers Killed or Injured by causes beyond their own control.	Proportion of the Number of Persons Injured to the Total of Passengers Carried.
1842.....	21,358,445	19	1 in 1,124,128
1843.....	25,572,525	6	1 in 4,262,087
1847.....	54,854,019	106	1 in 517,490
1st 6 months of } 1848	26,330,492	66	1 in 398,947

The numbers injured comparatively to the whole number of passengers, were thus in 1843, in round numbers, one in upwards of four millions; in the first half of 1848, one in four hundred thousand. The accidents being more numerous in 1848 than in 1843, in the proportion

* Appendix to Report of Select Committee on Railway Acts Enactments, (687.)

of ten to one, a result to be mainly attributed to the joint operation of express trains running at great speeds very different to those of the other trains, (and therefore disarranging the whole traffic along the line on which they run, see note to page 333,) and of the extraordinary increase of the number of trains. The increased number of trains is the result of the lowering of fares, and the consequent increase of traffic coupled with the extraordinary and often unreasonable demands of late made by the public for more frequent opportunities of travelling. The difference in the number of trains on British and Continental railways is remarkable.

Hitherto, therefore, the demands which the public have so peremptorily urged upon the railway companies, must be regarded as having materially diminished the safety of railway travelling, as experienced engineers predicted they would.

Speed.

The following Tables show the increase of speed in the express, and the average trains as compared with 1843. The lines are arranged in the order of their speed.

Highest Speeds on the Metropolitan Railways. In 1843.—July.

Name of Railway.	Speed in Miles per hour.	REMARKS.
London and Brighton	28·8	(Narrow Gauge.)
Great Western.....	27·4	To Beam Bridge. (Broad Gauge.)
South-Eastern.....	26·6	To Folkestone. (Narrow Gauge.)
London and South-Western	25·4	To Gosport. (Narrow Gauge.)
Eastern Counties.....	25·1	To Colchester. (Narrow Gauge.)
London and Birmingham	23·6	(Narrow Gauge.)

In 1848.—June.

Name of Railway.	Speed in Miles per hour.	REMARKS.
London and South-Western	44·5	To Southampton. (Narrow Gauge.)
Great Western.....	43·8	To Exeter. (Broad Gauge.)
South-Eastern.....	35·2	To Dover. (Narrow Gauge.)
London and North-Western	34·9	To Liverpool. (Narrow Gauge.)
London and Brighton	33·6	(Narrow Gauge.)
Eastern Counties.....	31·3	To Cambridge. (Narrow Gauge.)

Average Speed of all the Through Trains (excluding the Express,) of the Metropolitan Railways.

Name of Railway.	No. of Trains.	Average Speed of all the Trains, excluding Express.	REMARKS.
		Miles per hr.	
Great Western	7	25·4	Broad Gauge, 1 3rd Class Train.
London and South-Western	8	23·9	Narrow Gauge, 2 do.
Eastern Counties	6	23·3	Narrow Gauge, 1 do.
London and Brighton	9	23·1	Narrow Gauge, 2 do.
South-Eastern	6	22·7	Narrow Gauge, 2 do.
London and North-Western	7	22·4	Narrow Gauge, 1 do.

I have distinguished in the column of remarks the broad gauge line, the Great Western, from the others, because there appears to be an impression on the part of a portion of the public, that the rate of travelling by express trains* is greatest on that line; this opinion it will be seen is not borne out by the facts.

It should be borne in mind in considering this question, that speed, as measured in the usual way of so many miles per hour, becomes of less value as regards saving of time, as the velocity increases, for instance, the difference (3 miles per hour) between 50 and 53 miles per hour only makes a difference of $7\frac{1}{2}$ minutes in accomplishing a journey of 100 miles, but the same difference of 3 miles per hour between 20 and 23 miles per hour, makes a difference in the same journey of 100 miles, of no less than 39 minutes.

The 7,150 miles of railway in course of construction are mainly in the agricultural districts, it may therefore be well to record some facts illustrating

The Usefulness of Railway Communication to Agriculture†.

First. As to the saving in driving live stock.

The loss in weight of stock in driving has been calculated‡, as on the average, for driving beasts 100 miles, 5 lbs. per quarter, or 20 lbs. per beast, equal to about 2 per. cent. of the weight.

For sheep, at 2 lbs. per quarter, or 8 lbs. per head, 10 per cent. of weight.

For pigs, at $2\frac{1}{2}$ lbs. per quarter, or 10 lbs. per head, 5 per cent. of weight.

This loss will of course vary according to different circumstances. I have had no opportunity of determining if the above is a fair average result, but the estimate of Mr. Smith (of Deanston) as regards beasts is higher. Very nearly all this is saved by railway conveyance; what railways can do in this respect may be inferred from the fact, that cattle were lately sent from Carlisle to Norwich, 250 miles, as the crow flies, in a day and night, without taking them out of the truck§.

In the facilities of sending meat, as is already done on a large scale,

In the conveyance of manure, lime, coal, and all the various appliances of modern agriculture,

* Express trains have been generally introduced, (perhaps indeed too generally of late,) for it is notorious that a train travelling at a much higher speed than that of the other train is, of all other arrangements, that most likely to cause derangement of the traffic and accidents. On almost all lines on which there are express trains ordinary trains have to wait at a siding to let the express train pass; if the express is late, as is every now and then the case on a long line of railway, there will be two or three trains containing passengers and merchandise kept waiting in sidings for it, and the whole regularity of the traffic for hours will be deranged. It is evident that in such cases express trains, far from adding to the aggregate accommodation afforded by the railway, must diminish that aggregate.

Still an English public will always feel an interest in anything like a race, and we accordingly find the different rates of the express trains a common subject of interest.

† See a pamphlet entitled "Irish Wants and Practical Remedies," by H. Brown, Esq., M.P., for much information on this subject.

‡ Mr. Hyde Clarke's contribution to Railway Statistics, who derives this estimate from the opinion of Mr. Hindley, M.P., and of other agriculturists.

§ Evidence before Select Committee on Railway Act Enactments, question 3,151 *et seq.*

In the transport of the produce of a farm,

In giving the farmer the command of more markets, and the opportunity of taking advantage of a turn in the market, the uses of railway communication are acknowledged by all agriculturists who have experienced their effects.

As illustrating some of the points, the following extract from the evidence of Mr. Smith, of Deanston, before the Railway Acts Enactment Committee in 1846, is curious.

Statement of the probable Exports and Imports from a farm of 200 acres on a Six Course Shift:—

	Tons.	cwt.	lbs.
IMPORTS.—Lime, Guano, Oilcakes, Coals, &c.	197	15	68
EXPORTS.—Wheat, Turnips, &c., &c.	148	19	36
	346	14	104

Comparative Estimate of Expenses by Railway and by Common Road.

Expense of transmitting the probable Exports and Imports for a year from a farm of 200 acres 15 miles by Railway:—

	£	s.	d.	£	s.	d.
347 tons, at 1 <i>d.</i> per ton per mile.....	21	13	9			
Say one person travelling by rail for 300 days at 1 <i>d.</i> per mile, 15 miles per day.....	18	15	0			
				40	8	9
Expense of transmitting the above by common road, with the exception of 29½ tons of cattle, 317½ tons at 6 <i>d.</i> per ton per mile.....	119	1	3			
Expense of cattle travelling by common road.....	3	15	0			
Say one person travelling per day for 200 days at 2 <i>s.</i> per day.....	20	0	0			
				142	16	3

Saving effected by railway per annum 102 7 6

Consequently, the rental of such a farm would be, without a railway, 400*l.* per annum, and with a railway, 10*s.* per acre more, or 500*l.* per annum*.

The following calculation is also added, to illustrate the saving effected by substituting railway conveyance for road conveyance in the exports and imports of one square mile of land. It will be seen, that according to this estimate, this saving is equivalent to 14*l.* per acre.

One Square Mile.

Expense of transmitting the probable Exports and Imports from one square mile, or 640 acres, deducting 40 acres for fences, &c.:—

	£	s.	d.	£	s.	d.
By railway.....	121	6	3			
By common road.....	428	8	9			

Saving effected by railway..... 307 2 6

Thirty years' purchase of the above saving 9,213 15 0

* "The evidence, not only where reference is made to a recently reclaimed, but also to a long settled district, shows that a constant consequence of improvements in the mode of conveyance has been a steady rise in the amount of rent throughout the district affected." (Poor Inquiry, Ireland, 1836.) Appendix H., part ii., page 39. Remarks on the Evidence, &c., by J. E. Bicheno, Esq., one of the Commissioners.

Such calculations as these are sometimes exaggerated, and must always be modified according to local circumstances, but they are not without use in indicating the manner in which the saving may be estimated.

It is satisfactory also to find that those who have had the opportunity of observation, as, for instance, Mr. Peto, M.P., appear to think well of agricultural traffic, as profitable to the railway. An opinion, which is confirmed by the investigation of Mr. Desart, into whose hands the Belgian Government placed the statistics of their railways, and who found from examination, that the traffic of the small towns and villages along a line, is proportionately greater than the traffic between two large cities at its termini.

These facts appear to be calculated to impart confidence as to railways in agricultural districts, always supposing they are made cheap.

The bearing of Railways on Local Rates

Is a point in connexion with this part of the subject, on which interest will be felt in those parts of the country where the introduction of railways is anticipated.

The following Table is compiled from a return given in by the London and Birmingham Railway Company, in 1844, to the Select Committee on Railways.

County.	Rateable value of the land in the different Counties before the Railway came.			Rateable value of the land occupied by the Railway at the average rate per acre of the respective Parishes.			Value at which the Railway and Buildings are assessed.			Rate per mile of Assessment on the Railway.			Per centage of the whole Parochial Rates paid by Railway.			Additional value conferred on the land of the Counties passed through by the Railway at 20 years' purchase of the Annual Rent-charge from which the Railway has relieved the Parish.		
	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£	s.	d.	£		
Middlesex	44,778	7	11	240	2	11	21,617	0	0	965	5	0	48	6	0	39,452		
Hertford	87,591	7	4	460	2	4	20,176	8	7	1,095	7	0	23	0	0	68,118		
Buckingham....	52,844	3	8	527	3	8	20,627	0	8	803	10	0	39	0	0	50,706		
Northampton ..	48,306	13	11	472	10	11	19,406	1	11	955	0	0	40	2	0	90,410		
Warwick	75,552	14	2	616	5	2	39,269	13	4	1,388	10	0	52	0	0	83,755		
City of Coventry	41,725	12	6	82	12	6	5,500	0	0	1,525	0	0	13	4	0	19,940		
Worcester	15,886	11	1	46	11	1	1,410	18	0	868	0	0	9	0	0	2,556		
Total	366,685	10	7	2,445	8	7	128,007	2	6	Average			1,085	13	0	32 per ct.	354,637	

In this case we see that the land, which before it was occupied by the railway, was only valued at 2,445*l.*, after the railway was established, was rated at 128,007*l.* Also that this railway paid 32 per cent., or one-third of the whole rates of the parishes it passed through, although it did not add in any degree to the burdens of the parish, inasmuch as it afforded regular occupation to all its servants.

Mechanical Improvements.

The Electric Telegraph has, during the last three years, been widely adopted as an auxiliary to the railway system. In 1839, it was laid down between London and Slough, on the Great Western Railway, but in 1843, I think it had only been adopted there and on the Blackwall Railway; since 1843, however, it has been extended over 1,800 miles of railway, (that is, over about half the railways open) and it is in daily course of further extension.

We are, therefore, indebted to our railways for the general extension of this most beneficial application of science to art.

The electric fluid itself passes along the wire at a computed rate of 280,000 miles per second, the distance, apart from the points of communication, has, therefore, no appreciable effect on the time of transmission of the message, which depends on the perfection of the mechanical means of spelling and reading at either end of the line. The rapidity of communication with which a message is practically transmitted, appears from the following facts, kindly furnished to me by Mr. Hatcher, the manager of the central establishment of the Electric Telegraph Company in Lothbury.

The average number of words in the messages from London to the North, are 198.

The average rate of spelling by the telegraph is 55 letters, or 10 words per minute.

Average time, therefore, of transmitting each message, 20 minutes.

The Queen's speech of 750 words, thus occupied in the transmission, 1 hour 15 minutes.

The Atmospheric Mode of Traction,

As applied to railways by a partial vacuum, formed by a stationary engine in a tube, within which a piston drawing the train, travels, was tried on the Dalkey Railway, near Dublin, (a little more than one mile in length) in 1844, and subsequently on the Croydon Railway for six miles; it still works satisfactorily, it is said, on the Irish line, but at Croydon it did not apparently, in the opinion of the managers of that railway, realize the advantages anticipated from it, and being expensive, it was abandoned, the line having been since worked by locomotive engines. On the South Devon Railway, an atmospheric pipe has been partially laid and is still at work, and from the well-known resource and skill of the engineer, who has recommended its application there, we may be sure that it will receive a fair trial.

On the other hand, the locomotive engine has been of late successfully applied to inclined planes, formerly worked by stationary engines and ropes.

The Question of Gauge.

This question has excited much interest within the last 3 years, in consequence of the lines of different widths (the one dimension being 7 ft. the other 4 ft. 8½ in.,) coming in contact with each other at Gloucester, and the evils of having two gauges becoming, in consequence of this, manifest.

A Royal Commission was appointed in 1845, to inquire into the

subject; they examined 46 witnesses, comprising all the most experienced engineers and managers of railways in the country; of these 46 witnesses 39 expressed strong opinions in favour of the necessity of uniformity of gauge, by the universal adoption of the ordinary gauge of 4 ft. 8½ in.: 3 expressed no opinion on that part of the subject, and 4, namely, Mr. Brunel, the engineer, who first adopted the gauge of 7 ft., and his three colleagues, officers of the Great Western Railway Company, contended that uniformity of gauge was not important, and that the 7 ft. gauge was the preferable dimension.

The Commissioners summed up their views as follows:—

1st. "That as regards the safety, accommodation, and convenience of passengers, no decided preference is due to either gauge, but that on the broad gauge, the motion is generally more easy at high velocities.

2ndly. "That in respect of speed*, we consider the advantages are with the broad gauge; but we think the public safety would be endangered in employing the greater capabilities of the broad gauge much beyond their present use, except on roads more consolidated and more substantially and perfectly formed than those of the existing lines.

3rdly. "That in the commercial case of the transport of goods, we believe the narrow gauge to possess the greater convenience, and to be the more suited to the general traffic of the country.

4thly. "That the broad gauge involves the greater outlay, and that we have not been able to discover, either in the maintenance of way, in the cost of locomotive power, or in the other annual expenses, any adequate reduction to compensate for the additional first cost.

"Therefore, esteeming the importance of the highest speed on express trains, for the accommodation of a comparatively small number of persons, however desirable that may be to them, as of far less moment, than affording increased convenience to the general traffic of the country, we are inclined to consider the narrow gauge as that which should be preferred for general convenience.

"That as any junction to be formed with a broad gauge line, would involve a break of gauge, provided our first recommendation be adopted, great commercial convenience would be obtained by reducing the gauge of the present broad gauge lines, to the narrow gauge of 4 ft. 8½ in., and we therefore think it desirable that some equitable means should be found of producing such entire uniformity of gauge, or of adopting such other course as would admit of the narrow gauge carriages passing without interruption or danger along the broad gauge lines."

The feasibility of this recommendation is apparent, from the following statement of the proportional lengths of lines of the two different gauges now open.

Miles of Railway on
Ordinary Gauge
of 4 feet 8½ inches.
3,200

Miles of Railway on
Exceptional Gauge
of 7 feet.
375

* As regards speed there appears to be some misapprehension on the part of the Commissioners; in the table of speed, at p. 332, we see that the narrow gauge express trains are faster than those on the Great Western (broad gauge) line. The impression as to the superior speed of the broad gauge has probably arisen from the fact that the Great Western line out of London to Swindon is much the flattest and straightest in the country, consequently much the highest speed is attained there.

The proportion of narrow to broad gauge railway, is then nearly as nine to one, and when the railways now in course of construction are completed, the disparity will be still greater. Under these circumstances it is clear, that if either gauge is to be altered, it must be that of which there is comparatively so much the shorter length laid.

The Commissioners adopt an estimate of one million of money as the cost of the alteration, which it seems could be effected without stopping the traffic, as was done on the Northern and Eastern Railway.

It is to be regretted that this is not done at once, before the evil and its attendant expense have gone further, as the attempt to compromise the question is leading to great expense, and to the adoption of an unsound mode of railway construction called the mixed gauge*, which is not only expensive, but less simple and safe than the ordinary form of railway on either gauge singly. This is especially objectionable, as all such expense must, as we have seen, ultimately fall on the public in the shape of charges, and *pro tanto* diminish the usefulness of railways.

A break of gauge is, in short, an obstruction, and as has been well said, "the common sense of mankind teaches them to remove obstructions from their roads." In peace it is a nuisance and expense, and in war, in the opinion of the commissioners, founded upon the evidence of the highest military authorities†, "it might expose the country to serious danger, by delaying the concentration of our forces."

Railway Clearing House.

Nothing more clearly shows the necessity of co-operation and unity of arrangement in the railway system, whether as regards gauge or other matters, than the operations of the railway clearing house‡, which was established in 1842, and is every year felt to be more useful.

The clearing house was established with the view of facilitating the transfer of wagons containing merchandise, or of carriages containing passengers, from one line to another.

The carriages and wagons of each railway circulate over all the railways on the same gauge. From each station in the country, a return is sent to the clearing house of all the wagons, and carriages despatched to any foreign line, or received from any foreign line. By these means, an account is kept by the clearing house as between the various companies, and is settled without difficulty by an exchange of cheques at the end of the month. This is, as is well known, the same in principle as the system adopted between the London banking houses.

The system is now extended to goods and to "passengers booked through" to other lines.

* See a letter to Lord John Russell, M.P., on the Mixed Gauge, by Joseph Locke, Esq., M.P., (the well-known Engineer). Mr. R. Stephenson has also expressed similar opinions; he calculates the additional expense of a mixed gauge over an ordinary single gauge railway as 6,000*l.* actual outlay, and 500*l.* additional annual working expense; an addition (capitalising the annual charge of 500*l.*) equivalent altogether to 18,500*l.* per mile for a less safe railway than the ordinary single gauge form of construction.

† The Quarter-Master General Sir Willoughby Gordon and the Inspector-General of Fortifications, Sir John Burgoyne. (See Evidence before Gauge Commissioners.)

‡ Origin and Results of the Railway Clearing House, by K. Morison, (Manager).

By this means, on railways, the carrying stock becomes so far as is necessary for convenience, common property, and each party using his neighbour's stock, pays according to the use he has of it.

So much is this done, that I have seen at Gloucester the station full of wagons, bringing goods from, or taking goods from almost every line in the country, not one of the Gloucester Company's own wagons being to be seen, they having been in turn sent laden to other lines.

This arrangement seems very simple, nevertheless it was long before it was adopted, and the extent to which it is useful may be judged of by the following return.

A Return of the Number of Loaded Carriages, Trucks for Private Carriages, Horse-Boxes, Post Office Carriages, and Goods' Wagons, (which went through without the lading being disturbed,) on the Lines of the Railway Companies, parties to the Clearing Arrangements in the year 1845.

Carriages.	Trucks for Private Carriages.	Horse-Boxes.	Post Offices.	Goods' Wagons.
59,765	5,813	7,573	2,607	180,606

Railway Mania.

This may be said to have commenced in the year 1844, and to have reached its height in 1845. On the 17th November, 1845, the Times published a list of projects comprising 1,263 railway companies, proposing to raise capital to the amount of five hundred and sixty-three millions. Many of these, of course, were mere bubbles, but there were actually presented to Parliament, in the session of 1846, 561 Railway Bills, and Parliament actually sanctioned in that year 4,600* miles of railway, and authorized the raising of capital on the shares of the companies, to the amount of one hundred and thirty-two millions.

It is scarcely credible that even this did not subdue the fever, which ran on through 1846, and did not die out until the latter part of the year 1847.

The legislative results were as follows:

During the years 1845, 1846, 1847, the Royal Assent was given to Bills, authorizing the construction of 8,900 miles of railway, requiring a capital of more than two hundred millions, of which more than thirty millions is destined to compensation to landowners for land taken by the companies.

In the year 1847, the calls of the English†, Scotch, and Welsh Railway Companies, amounted to thirty-four millions, of which probably twenty-five millions were raised and spent during that year.

The extravagant waste of money in the parliamentary contests upon the Bills, is not the least painful feature of the case.

The deposits with the Accountant-General, for 1845 and 1846, were 18,647,701*l*. Those for 1847 I have not been able to obtain, they must, together with those of 1846, have amounted to not less than twenty millions. Of these, probably not as much as one-half has found its way back into the pockets of the depositors.

* Return, House of Commons, (1847) 708.

† The calls on Irish railways were 1,900,000*l*., foreign railways 6,700,000*l*.; in all forty-three millions in one year, 1847.

More than *ten millions* has thus been thrown away for parliamentary inquiries and parliamentary contests during these three years, and the greater part has been saddled on the railways sanctioned, for which the public will have permanently to pay interest, in the shape of higher charges and fares.

This completely eclipses the 200,000*l.* parliamentary expenses of the London and Brighton Railway, which used to appear enormous.

The fluctuations in the price of railway shares during this period, were as follows* :—

Railway.	July, 1844.		July, 1845.		July, 1846.		July, 1847.		July, 1848.	
	Paid.	Price.	Paid.	Price.	Paid.	Price.	Paid.	Price.	Paid.	Price.
Great Western.....	£ 70	£ 125	£ 80	£ 205	£ 85	£ 150	£ 85	£ 117	£ 90	£ 87
London and Birmingham	100	218	100	243	100	225	100	183	100	121½
Midland Stock.....	100	95	100	187	100	151	100	130	100	101½

These premiums, varying from nothing to 125*l.* on the Great Western shares, from 20*l.* to 140*l.* on the London and North Western, from a discount to a premium of 80*l.* on the Midland, are from half-yearly averages; be it remembered, the extreme fluctuations must have been even greater than this.

Railway Legislation.

It is not within the province of a statistical inquiry to treat of the want of good faith or of any definite principle which has characterized our law-making on railways. Our railway system may, without exaggeration, be said to have arisen in spite of the legislature.

The prodigious expense attending our system of parliamentary inquiry is impressed upon my mind by the following fact within my own knowledge, that upwards of 800,000*l.* has, in one district†, been spent in parliamentary surveys and contests, the results being 350 miles of railways, by no means laid out in the most judicious way; the parliamentary expenses will, therefore, in this case, exceed the cost of the iron rails themselves on the lines finally passed.

The capriciousness and uncertainty of parliamentary tribunals, are shown by the following facts‡.

Of 18 Bills rejected by certain Committees of the Commons in 1845, seven were passed by other Committees when brought forward again in 1846.

Of 6 Bills rejected by certain Committees of the Lords in 1845, four were passed by other Committees of the Lords when brought forward again in 1846.

Six Bills were passed by the Commons in 1845, but rejected on precisely the same evidence in the Lords in the same year.

* "Tuck's Shareholder's Manual," 1848.

† That between Gloucester, Wolverhampton, and London.

‡ See Mr. Shaen on Railway Legislation (Pickering, 1847,) for curious information on this subject.

The treatment of the Board of Trade Reports in 1845, is of the same character.

Parliament, in 1845, called in as assessors, the Railway Department of the Board of Trade, and required their opinion on the schemes before Parliament: that department accordingly divided the railways into several groups, and reported upon them.

Parliament, however, overset the recommendation of its own assessors with regard to the first and principal group that came before it, and proceeded to do the same in the case of the five other principal groups of lines reported upon.

It is obvious that no confidence can be placed in the judgment of a tribunal, the proceedings of which are so inconsistent as this, and it is difficult to conceive why railway bills are passed before two tribunals (Lords and Commons) composed of inexperienced persons, at an enormous expense, instead of before one experienced and competent tribunal, or why members of the legislature submit to sit for days and weeks in judgment on technical matters on which their training does not qualify them to give an opinion.

The saving effected by Railways

Is a point we sometimes hear debated, and it may be well to attempt a rough computation of it.

Railways save time, and time with an industrious people like our's, is another word for labour, which is the source of wealth, to save time is therefore to increase wealth, but this we cannot bring to the test of figures, as we cannot tell what proportion of railway passengers occupy their time profitably to the country.

If we were to take the test of fares, indeed, as some would contend we should, seeing that the fares by former modes of travelling were double the present railway fares, and that 4,998,000*l.* was spent on railway travelling in 1847, the saving might in this way of regarding the question, be estimated as equal to this sum; but let us confine the calculation to the saving in connection with the transport of goods, coal, and cattle, where the data are more certain.

There have been conveyed during the last year, as we have seen, seven million tons of goods.

The value of these goods will be not less than 100 millions; the value of the goods in transit daily cannot therefore be less than 300,000*l.*

Calling the average time of goods in transit by railway 1 day, and by the former modes of conveyance 3 days, it follows that there must be a saving on the value of the goods in transit at any one time of 600,000*l.*, due to the rapidity of railway conveyance.

This amount of capital is released by railways, and instead of being unproductively locked up in the shape of goods in transit, it is free to be invested reproductively in the transactions of commerce.

The charges for goods have been, during the year 1847, 1,900,000*l.*, taking the railway charge as three-fourths of the charges by former modes of conveyance, here is a further saving of 666,000*l.*

Eight million tons of coal have been conveyed during the year; taking the saving of railway conveyance at only 2*s.* per ton, here is a saving of 800,000*l.*

The same principles of calculation might be applied to cattle, sheep, and pigs.

I have endeavoured to avoid anything like exaggeration in this rough estimate, and from these figures, I think it appears, that in the transport of goods, coal, and cattle traffic, there is already a direct saving to the nation of more than two millions annually, due to the introduction of railways.

The revenue at the same time, it will be seen from the following figures, has been a direct gainer by railways.

In the following statement, the branches of the revenue which may be considered as most likely to have been affected by railway, namely: the stage-coach duty, the tax on carriages, the post-horse duty, and the tax on horses, are compared in 1834 (before any of the large towns, except Liverpool and Manchester, were joined by railway) and in 1845, when railways were laid on almost all the main routes.

	1834.	1845.
	£	£
Stage Coach Duty	445,641	431,371
Post Horse Duty	215,682	176,618
Horses, Tax	414,257	307,122
Carriages, Tax	406,487	421,127
	1,482,077	1,336,231
Railway Passenger Duty		250,000
		1,586,238

The result it will be seen is, that the stage-coach duties are about the same in amount as before railways were introduced, and that the tax on carriages has increased, but that the taxes on horses produce less; whether these results are to be entirely attributed to railways or not, I do not know, but it will be seen, that the total falling off in these items (146,000*l.*) is more than covered by the railway passenger tax, which has produced 250,000*l.* last year, so that the revenue is a gainer by the exchange.

Conclusion.—The result of the preceding inquiry is, it appears to me, on the whole, satisfactory. The railway system has doubled itself in the last three years. Fares have been greatly reduced—the number of 3rd class passengers, the majority of which are of the working class, has largely increased. The importance and value of the traffic in goods and cattle, which may be much farther developed than it has been, has become more apparent, relatively to the passenger traffic. The number of trains is greater—the speed of some of those trains has been accelerated, and all this has been effected without any falling off in the average receipts on each mile of railway in working, but with an increase, probably sufficient or nearly so to meet the increase in the working expenses attendant on the increased accommodation now afforded. Whatever falling off in dividends there may have been is, therefore, hitherto to be attributed, in a general view of the subject, to

additions to the trunk lines required in order to meet the increased quantity of traffic consequent on the lowering of fares, to the capitalisation of loans, and the creation of fictitious capital, principally by the purchase of railways at premiums, and therefore at sums beyond what they actually cost. These being profitable operations when shares were high, were pushed to such an extent, as now to press severely on the original share capital of railway companies.

The great evil of the last three years, is the extravagant outlay of money which has taken place—an outlay, which instead of being checked by the legislature, has been encouraged to the utmost by the mode of legislative inquiry adopted. This has inflicted on the railway system a burden which it will never be able to throw off, and which the public will always have to submit to a higher rate of charge for conveyance than would, with common prudence, have been necessary. It only remains to stop this extravagance with a strong hand. The very existence of the railway companies depends on the economy they can practice in making and working their railways—and nothing, which on the face of it, involves increased outlay—be it diversity of gauge and its consequence the mixed gauge, or be it under the more plausible plea of competition, should be countenanced either by railway companies or the legislature, if we wish to secure for ourselves the full fruits of that admirable invention, which England and the English engineers, who have followed in the steps of George Stephenson, have given to the world.

Railway Accidents.

By an Analysis of the Returns made to the Railway Department, it appears that of the 90 persons killed and 99 injured, on all the Railways open for public traffic in Great Britain and Ireland, during the half-year ending the 30th June, 1848, there were—

6 Passengers killed, and	60 injured from causes beyond their own control.
5 Passengers killed, and	2 injured, owing to their own misconduct or want of caution.
7 Servants of Companies or of Contractors killed, and }	14 injured from causes beyond their own control.
52 Servants of Companies or of Contractors killed, and }	18 injured, owing to their own misconduct or want of caution.
18 Trespassers and other persons, neither Passengers nor Servants killed, and	5 injured by improperly crossing or standing on the railway.
1 person run over and killed, at a crossing, through misconduct of an engine-driver.	
1 suicide.	
<hr/> TOTAL.... 90 killed.	<hr/> 99 injured.

And for the same period the number of passengers amounted to 26,330,492.